Audit Report

OFFICE OF THE INSPECTOR GENERAL

QUICK-REACTION REPORT ON THE ACQUISITION OF THE STANDARD MISSILE II WITH BLOCK IIIB UPGRADE

Report No. 94-140 June 16, 1994

Department of Defense

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DEPARTMENT OF DEFENSE
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June 16, 1994

MEMORANDUM FOR ASSISTANT SECRETARY OF THE NAVY (FINANCIAL MANAGEMENT)

SUBJECT: Quick-Reaction Report on the Acquisition of the Standard Missile II With Block IIIB Upgrade (Report No. 94-140.)

We are providing this final report for your review and comments. This is the first of two reports on the Standard Missile II upgrade programs. This report addresses the Standard Missile II Block IIIB requirements. Comments on a draft of this report were not received as of the report date and could not be considered in preparing the final report.

DoD Directive 7650.3 requires that all recommendations be resolved promptly. Therefore, we request that the Deputy Chief of Naval Operations and the Assistant Secretary of the Navy (Research, Development and Acquisition) provide comments on the finding, recommendations, and potential monetary benefits by July 18, 1994. DoD Directive 7650.3 also requires that comments indicate concurrence or nonconcurrence in each recommendation addressed to you. If you concur, describe the corrective actions taken or planned, the completion dates for actions already taken, and the estimated dates for completion of planned actions. If you nonconcur, state your specific reasons for each nonconcurrence. If appropriate, you may propose alternative methods for accomplishing desired improvements.

If you nonconcur with the estimated monetary benefits of $436.2 million or any part, you must state the amount you nonconcur with and the basis for your nonconcurrence. Recommendations and potential monetary benefits are subject to resolution in accordance with DoD Directive 7650.3 in the event of nonconcurrence or failure to comment.

The courtesies extended to the audit staff are appreciated. If you have any questions on this audit, please contact Mr. John Meling, Program Director, at (703) 614-3994 (DSN 223-3994) or Mr. Thomas Bartoszek, Project Manager, at (703) 693-0481 (DSN 223-0481). Appendix C lists the distribution of the report. The audit team members are listed inside the back cover.

David K. Steensma

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Office of the Inspector General, DoD

Report No. 94-140 **June 16, 1994**
(Project No. 4AS-0004.00)

QUICK-REACTION REPORT ON THE ACQUISITION OF THE STANDARD MISSILE II WITH BLOCK IIIB UPGRADE

EXECUTIVE SUMMARY

Introduction. This is the first of two reports on the Standard Missile II upgrade programs. The Standard Missile II is a tactical missile system that provides area defense for the U.S. Navy surface fleet against hostile aircraft and missiles launched from air, sea, underwater, and land platforms. The Standard Missile II with Block IIIB upgrade (Block IIIB missile) is a major performance upgrade to counter a new jamming threat. The Block IIIB missile will be deployed from Navy AEGIS class cruisers and destroyers. The Navy began Block IIIB missile development in January 1989 and plans to make the production and deployment decision in August 1994. The Navy estimated development and procurement costs of $537 million (then-year dollars) for 960 Block IIIB all-up-round missiles (procurement of the entire missile) and $190.5 million (then-year dollars) for retrofit of 1,100 Standard Missile IIs with the Blocks II and III upgrades to the Block IIIB missile configuration.

Objective. We reviewed Block IIIB missile requirements' evolution and affordability as part of our audit of the Standard Missile II: Block IIIB, Block IV, and Block IVA Upgrades. This report is being provided to alert management that the Navy needs to discuss and reassess the Block IIIB missile requirements at its Program Decision meeting scheduled for August 1994.

Audit Results. Navy requirements for the Block IIIB missile were overstated by 987 missiles. Also, the Navy's planned production of 960 all-up-round Block IIIB missiles is not cost-effective because sufficient quantities of Block II and Block III upgraded missiles are available that can be retrofitted to satisfy Block IIIB missile requirements. As a result, the Navy can reduce costs by reducing Block IIIB missile requirements and not acquiring Block IIIB all-up-round missile production during the Future Years Defense Program (FYs 1994 through 1999).

Internal Controls. The internal controls applicable to the Block IIIB missile requirements determination were deemed to be effective in that no material internal control weaknesses were found during the audit. See Part I for the internal controls assessed.

Potential Benefit of Audit. We estimated that the Navy could reduce costs by about $436.2 million by revising production requirements (Appendix A).

Summary of Recommendations. We recommended that the Deputy Chief of Naval Operations reduce Block IIIB missile requirements by eliminating battle consumption replacement missile quantities and economic order quantities from the requirements computation. We recommended that the Assistant Secretary of the Navy (Research, Development and Acquisition) cancel plans to acquire all-up-round production missiles containing the Block IIIB upgrade.

Management Comments. The Deputy Chief of Naval Operations and the Assistant Secretary of the Navy (Research, Development and Acquisition) did not provide written comments to the draft of this report. We request that these offices comment on the report finding, recommendations, and potential monetary benefits by July 18, 1994.

Table of Contents

This report was prepared by the Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, Department of Defense.

Part I - Introduction

Background

The Standard Missile II is a tactical missile system that provides area defense for the U.S. Navy's surface fleet against hostile aircraft and missiles and is currently deployed on U.S. Navy guided-missile cruisers, destroyers, and frigates. The Standard Missile II with Block IIIB Upgrade (Block IIIB missile) is designed to counter a new threat to Navy ships. The Navy began Block IIIB missile development in January 1989 and plans to make the production and deployment decision in August 1994. The AEGIS fleet will be the only user of the Block IIIB missile. The Standard Missile Program Office, Naval Sea Systems Command, manages the Standard Missile Program.

In September 1991, the Navy awarded a cost-plus-award-fee contract totaling $156.2 million for the Block IIIB missile's engineering and manufacturing development to IRISS, a Raytheon-Hughes joint venture. The Navy plans to procure 960 new Block IIIB all-up-round missiles (procurement of the entire missile) and to retrofit (modify) 1,100 Blocks II and III configured missiles into the Block IIIB missile configuration. Block IIIB missile program costs are estimated to total about $727.5 million in then-year dollars: $537 million for 960 all-up-round production missiles and $190.5 million for retrofit of 1,100 Blocks II and III missiles. Funding in the Future Years Defense Program (FYs 1994 through 1999) includes 800 new production Block IIIB missiles and retrofit of 879 Blocks II and III missiles.

During the audit, the House Committee on Appropriations denied the Navy's FY 1994 production funding for the Block IIIB missile based on the Committee's understanding that inventory requirements for the Standard Missile II may change substantially after the Navy has concluded its 1996 Program Objective Memorandum review. Pending the review results, the Committee believed that a Block IIIB missile production program was premature. Regardless, the Navy plans to hold a Block IIIB missile production and deployment Program Decision meeting in August 1994 and to begin production in January 1995 if funding is available.

Objectives

The audit objective was to evaluate the effectiveness of the acquisition management of the Standard Missile II upgrade programs to determine whether the missile upgrades were being cost-effectively developed and procured. We followed our critical program management elements approach for the audit. The objectives and scope of the audit were tailored to the status of the Standard Missile II upgrade in the late engineering and manufacturing development phase

of the acquisition process. We reviewed requirements' evolution and affordability, acquisition planning and risk management, engineering and manufacturing, logistics and other infrastructure, test and evaluation, contract performance measurement, contracting, and internal controls related to these objectives.

During the survey, we determined that Block IIIB missile requirements exceeded the quantities needed to meet the validated threat. Because the Navy plans to hold a production and deployment decision meeting for the Block IIIB missile in August 1994, we are addressing the audit objective Block IIIB missile requirements' evolution in this Quick-Reaction report. At the completion of the audit, we will issue an overall report that will address the remaining audit objectives.

Scope and Methodology

This program results audit was conducted from September 1993 through April 1994 in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD, and accordingly included such tests of internal controls as were considered necessary. We reviewed accounting and program data dated from January 1989 through April 1994 to accomplish our analysis of Block IIIB missile requirements. We reviewed ship inventory; Standard Missile II ship load capacity; missile requirements for battle consumption, training, and testing; the current inventory of Block II and III missiles; and the effects on the industrial base. We interviewed DoD and contractor personnel responsible for the Standard Missile II program. We did not rely on computer-generated data to develop our audit conclusions. Appendix B lists the organizations visited or contacted.

Internal Controls

We assessed internal controls related to the requirements' evolution of the Block IIIB missile. We evaluated internal control techniques, such as management plans and reports, written policies and procedures, and various independent reviews of the program. The audit identified no internal control weaknesses as defined by DoD Directive 5010.38," Internal Management Control Program," April 14, 1987.

Prior Audits and Other Reviews

No recent audits of the Block IIIB missile requirements required follow-up action.

Part II - Finding and Recommendations

Standard Missile II With Block IIIB Upgrade Requirements

The Navy overstated Block IIIB missile requirements by 987 missiles. The overstatement was caused by the Navy's not complying with Navy policy for determining missile requirements based on procurement quantities needed to meet the threat. Also, the Navy's planned procurement of 960 all-up-round Block IIIB missiles was not cost-effective because enough Blocks II and III missiles are available that can be retrofitted to satisfy Block IIIB missile requirements. As a result, the Navy could reduce procurement costs by $436.2 million over the Future Years Defense Program (FYs 1994 through 1999) and put these funds to better use.

Background

Navy Policy. Office of the Chief of Naval Operations Instruction 8011.9A, "Non-Nuclear Ordnance Requirements Process," August 11, 1989, requires that requirements for threat ordnance, including the Standard Missile II, be determined based on the validated threat. The Instruction states that the determination of quantities of threat ordnance needed is to be based on the combat requirement to achieve program and planning objectives identified in the Defense Guidance. Also, threat ordnance computations are to be based on killing specific percentages of the validated enemy threat and are to include maintenance quantities.

Navy Factors Used to Compute Block IIIB Requirements. To compute the number of Block IIIB missiles needed to defeat the threat, the Navy added the planned load of Block IIIB missiles on deployable AEGIS ships and the battle consumption replacement requirements. To the total of those two factors, the Navy applied fixed percentages of 13 percent to determine the number of missiles required to satisfy maintenance requirements and 3 percent to determine the number of missiles required to satisfy testing and training requirements.

Deployable Ships and Load Capacity. In preparing its computation for Program Objective Memorandum 1994 (FYs 1994 through 1999) Standard Missile II requirements, the Navy showed a planned inventory of 52 AEGIS class cruisers and destroyers. The planned Standard Missile II loads on the AEGIS ships consisted of a combination of Block II, Block III, Block IIIA, Block IIIB, and Block IV/IVA Standard Missile IIs. The Naval Surface Warfare Center, Carderock Division (the Center), considers only 62 percent of the 52 AEGIS ships (32 ships) to be deployable in making requirement computations. For each ship, the Center used a Standard Missile II load capacity of 60 missiles. The Center indicated that the nominal load of Block IIIB missiles is 33 percent of the ship's Standard Missile II inventory. By

FY 2007, the Navy plans to have an inventory of 79 AEGIS class ships (22 cruisers and 57 destroyers). The Navy's Program Objective Memorandum 1994 did not include Block IIIB missile funding for 27 of the 79 AEGIS class ships because the 27 ships were unfunded and planned for delivery after FY 1999.

Battle Consumption. The "Navy Non-Nuclear Ordnance Requirements Document," November 1992, states that in making a threat-oriented requirements computation, requirements are limited to the number of enemy targets to be destroyed. When the enemy targets are destroyed, the missile requirement is satisfied. This method is to be used when:

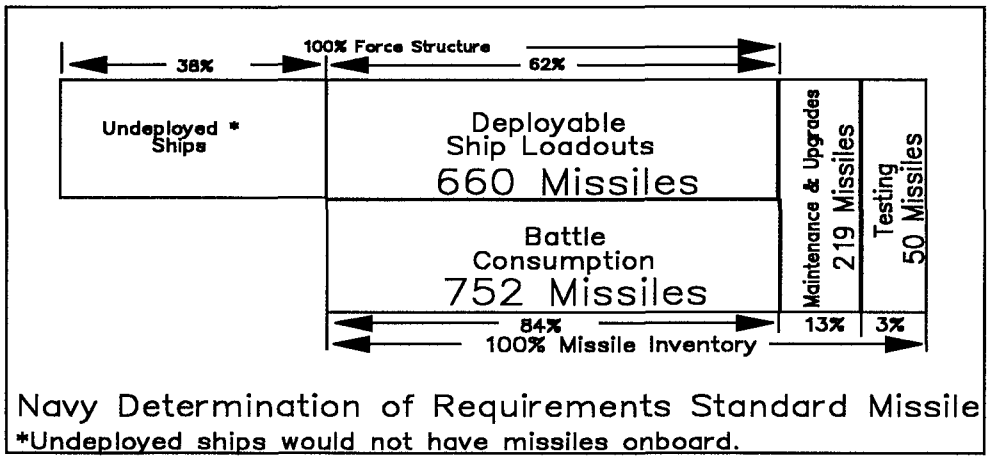
- o one or more enemy targets for the munition are high-value targets,
- o the quantity of enemy targets for the munition is generally known,
- o the munition can be guided to a specific target, and
- o the munition is a high-value munition.

Since the Block IIIB missile met those criteria, Block IIIB missile requirements are limited to the number needed to destroy the number of enemy targets world-wide.

Naval Surface Warfare Center Analysis for Computing Block IIIB Requirements. In November 1993, the Center issued a report on "Standard Missile Inventory Objectives and Magazine Mix Requirements Analysis." In the report, the Center quantified and identified near-term Standard Missile II variants by analyzing the effect of different ship loads of Block IIIB, Block IV, and Block IVA missiles in operational scenarios using representative real-world threats and conditions. Based on the Defense Guidance, the Center used operational scenarios for conducting two simultaneous campaigns, one in the Middle East and one in the Northeast Asia. For deriving Block IIIB missile inventory objectives, the Center based its computation on:

- o deployable ship load (62 percent of deployable force structure based on AEGIS class ship operational experience),
- o nominal Block IIIB missile load of 33 percent of ship's Standard Missile II inventory,
- o 100 percent replacement of expended inventory following hostilities,
- o missile maintenance quantities of 13 percent, and
- o missile testing and training quantities of 3 percent.

The Center estimated that deployed AEGIS ships would expend 752 Block IIIB missiles in a worst case threat scenario. Based on those assumptions, the Center computed a Block IIIB inventory objective of 1,681 missiles as shown below.



Navy Determination of Requirements Standard Missile

*Undeployed ships would not have missiles onboard.

Calculation of Block IIIB Missile Requirements

The Navy overstated Block IIIB missile requirements by 987 missiles. The overstatement was caused by the Navy's not complying with its own policy for determining missile requirements based on procurement quantities needed to meet the threat. The table below shows the 987 missiles difference between the Navy's and our computation of Block IIIB missile requirements.

Navy Requirements Are Overstated

Requirement	Estimates		Difference
	Navy	Audit	
Deployable Load	660	901	241
Combat Expenditures	752	0	(752)
Maintenance and Testing	269	172	(97)
Economic Quantity Increase	379	0	(379)
Total	2,060	1,073	(987)

Deployable Load. The deployable load difference of 241 Block IIIB missiles was caused by the Navy increasing by four the number of AEGIS class ships that will be in the inventory in FY 1999 and assuming that each deployable ship would load 20 Block IIIB missiles.

o **Number of Ships.** In a February 2, 1994, memorandum, the Under Secretary of Defense for Acquisition and Technology stated that the Navy would have an inventory of 34 AEGIS class destroyers by FY 1999. Adding the 34 AEGIS class destroyers to the 22 existing AEGIS class cruisers in inventory gives a total of 56 AEGIS class ships in the inventory in FY 1999 versus the inventory of 52 AEGIS ships used in the Navy's requirements computation.

o **Ship Loads.** The Standard Missile II load capacity for the Aegis class cruisers varies from 74 to 103 missiles. Therefore, the Block IIIB missile load for the 22 cruisers ranges from 25 missiles to 35 missiles based on a nominal Block IIIB load of 33 percent of a ship's Standard Missile II inventory. Similarly, the Standard Missile II load capacity for the AEGIS class destroyers is 73 missiles. Therefore, the Block IIIB missile load for the 34 destroyers is 25 missiles based on a nominal Block IIIB load of 33 percent of a ship's Standard Missile II inventory.

To make our deployable load computation, we multiplied the inventory of 56 AEGIS class ships by the 62 percent factor to determine the number of deployable ships (35 ships). From the Navy's AEGIS Combat System Capability report dated March 8, 1994, we determined that the actual Standard Missile II load capacity for the 35 ships would be 2,730 missiles based on an average shipload of 78 missiles. We then multiplied the inventory of 2,730 missiles by 33 percent, the nominal Block IIIB load percentage of a ship's Standard Missile II inventory, to determine the Block IIIB missile requirement of 901 missiles for deployable ships in FY 1999.

To make its deployable load computation, the Navy multiplied its inventory of 52 AEGIS class ships by the 62 percent factor to determine the number of deployable ships (33 ships). The Navy then multiplied the 33 ships by a load of 20 Block IIIB missiles to determine its Block IIIB missile requirement of 660 missiles for deployable ships.

Accordingly, the Navy's Block IIIB missile computation for deployable AEGIS class ships in FY 1999 was understated by 241 missiles (901 missiles less 660 missiles).

Combat Expenditures. The Navy unnecessarily included battle consumption replacement quantities of 752 Block IIIB missiles in its Block IIIB missile requirements computation because the missile meets the definition of a threat-oriented munition. We agree that each deployed ship should be able to defeat the validated threat in realistic operational scenarios and have a nominal load of Block IIIB missiles that is 33 percent of the ship's Standard Missile II inventory. However, once the enemy targets are destroyed during a campaign, the Block IIIB missile requirement is satisfied. In addition, Block IIIB missile resupply of forward-based AEGIS class ships to engage the remaining threat in the current and subsequent campaigns is to come from Block IIIB missile inventories on AEGIS class ships that were not engaged in the conflict. Accordingly, the requirement to replace Block IIIB missiles expended in battle is not needed, as stated in the Navy Non-Nuclear Ordnance Requirements Document.

Maintenance and Testing. The Navy maintenance and testing difference of 97 Block IIIB missiles resulted from applying the 13 percent factor for missile maintenance quantities and 3 percent factor for testing quantities to different missile quantity bases. The Navy used a missile quantity base of 1,412 Block IIIB missiles for deployable load and combat expenditures while we used the missile quantity base of 901 Block IIIB missiles for deployable load only.

Economic Quantity Increase. The Assistant Chief of Naval Operations (Surface Warfare) modified the results of the Naval Surface Warfare Center Analysis when finalizing the Navy's stated Block IIIB missile requirement. To the Center's inventory objective of 1,681 missiles, the Assistant Chief of Naval Operations added 379 missiles, giving the total Block IIIB missile requirements of 2,060 missiles. The Navy explained that it increased the total Block IIIB missile procurement quantity by 379 missiles to sustain the Standard Missile II production base and to provide a more economic cost per missile.

Production of all-up-round Block IIIB missiles is not needed to maintain the Standard Missile II production base. Raytheon and Hughes have contracts to produce a combined 550 Block IIIA all-up-round missiles through FY 1994. In FY 1995, the Navy plans to award a contract for Block IV low-rate initial production contracts. Also, the contractors must produce components for kits to retrofit Blocks II and III missiles to the Block IIIB missile configuration. Therefore, the Standard Missile II production base should not be affected by the elimination of the requirement to acquire Block IIIB all-up-round missiles.

By eliminating production of all-up-round missiles, contractor overhead rates applied to unit costs on other Standard Missile II contracts will increase. The extent of the increase is not known. However, we believe that the cost benefits of eliminating all-up-round Block IIIB missiles will outweigh the effect of higher contractor overhead rates on remaining Standard Missile II contracts.

Based on the lower computed requirements for Block IIIB missiles, the Navy no longer needs to procure Block IIIB all-up-round missiles. The Navy had enough Blocks II and III missiles available that can be retrofitted to satisfy Block IIIB missile requirements. As of April 30, 1994, the Navy had 1,493 Blocks II and III variants that can be retrofitted to the Block IIIB configuration at an average cost of $173,152. The cost to retrofit a missile to the Block IIIB configuration is nearly $320,000 less per missile than to procure new all-up-round Block IIIB missiles at a cost of $493,000 per missile. Accordingly, the Navy can reduce procurement costs by not acquiring 960 Block IIIB all-up-round missiles as planned to satisfy Block IIIB requirements.

Conclusion

We agree that each ship should have the capability to defend against a validated threat. Therefore, ship load is a major factor in the requirements determination. However, ship load and reload should be determined based on the validated threat. Further, the production of the Block IIIB all-up-round missiles is no longer required because of the changed threat and the availability of Blocks II and III missiles that can be retrofitted to a Block IIIB missile configuration. By eliminating the production of Block IIIB all-up-round missiles, the Navy can reduce missile procurement costs by about $436.2 million in the Future Years Defense Plan and an additional $101 million over the life of the Block IIIB upgrade program.

Recommendations, Management Comments, and Audit Response

1. We recommend that the Deputy Chief of Naval Operations reduce Standard Missile II with Block IIIB upgrade requirements by not including battle consumption replacement and economic order quantities in its Block IIIB missile requirements computation.

2. We recommend that the Assistant Secretary of the Navy (Research, Development and Acquisition) cancel plans to acquire 960 all-up-rounds of the Standard Missile II with Block IIIB upgrade.

Management Comments. No management comments were received to the draft report.

Audit Response. Management is requested to comment on the final report by July 18, 1994, in accordance with DoD Directive 7650.3.

Part III - Additional Information

Appendix A. Summary of Potential Benefits Resulting From Audit

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
1.	Compliance with Regulations. Will ensure that the Navy determines Standard Missile II with Block IIIB upgrade requirements based on the threat.	Monetary. The Navy could put to better use $436.2 million over the Future Years Defense Program. (FYs 1994 through 1999 Missile Procurement, Navy)
2.	Economy and Efficiency. Will ensure that the Navy cost-effectively acquires Block IIIB missiles.	Monetary. $436.2 million included in Recommendation 1.

Appendix B. Organizations Visited or Contacted

Department of Defense

Office of the Under Secretary of Defense for Acquisition and Technology, Washington, DC

Department of the Navy

Office of the Chief of Naval Operations, Washington, DC
Naval Sea Systems Command, Arlington, VA
  Standard Missile Program Office, Arlington, VA
Office of Naval Intelligence, Washington, DC
Naval Surface Warfare Center, Bethesda, MD
Naval Surface Warfare Center, Port Hueneme, CA
Naval Audit Service, Falls Church, VA

Contractors

Hughes, Tucson, AZ
Raytheon, Bedford, MA

Appendix C. Report Distribution

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